GLOBAL FORCES, LOCAL IMPACTS
Computer Mapping Services

Nowhere is the contrast between global and local scales most immediately visible than on computer maps. The home page of a leading computer mapping service, such as Google Maps (**maps.google.com**), Microsoft Maps (**local.live.com**), or Yahoo Maps (**maps.yahoo.com/beta**), typically starts with an outline map of the United States. Users typically have the choice of "map" (names and political boundaries), "satellite" (photographic image), or "hybrid" (combination of map and satellite image).

The minus key extends the map to an outline of the entire world. Switch to the satellite setting to see photographic imagery of the entire world, similar to that shown on page 8. Visible at the most global scale are bodies of water, mountain ranges, deserts, and ice caps. The plus setting zooms the map in to the local scale. Visible at the most local scale are houses, bridges, and fields.

Desktop mapping has become most useful at the local level. Mapping services have given computer programmers access to the application programming interface (API), which is the language that links a database such as an address list with software such as mapping. The API for mapping software, available at such sites as **www.google.com/apis/maps**, enables a computer programmer to create a mash-up that places data on a map.

Programmers have used mapping services' API to create mash-up maps primarily at the local scale. The term *mash-up* refers to the practice of overlaying data from one source on top of one of the mapping services and comes from the hip-hop practice of mixing two or more songs. Mash-up maps can show the locations of businesses and activities near a particular street or within a neighborhood in a city. The requested information could be all restaurants within $\frac{1}{2}$ mile of an address, or to be even more specific, all pizza parlors (Figure1–1.1). Mapping software can show the precise location of commercial airplanes currently in the air, the gas stations with the cheapest prices, and current traffic tie-ups on highways and bridges.

In some cities, mash-ups assist in finding housing. The location of houses currently for sale and apartments currently for rent can be pinpointed. A map showing the prices of recently sold houses in the area can help a potential buyer determine how much to offer. A map showing the locations of crime in the city can help the buyer determine the safety of the surrounding area. Bars, hotels, sports facilities, transit stops, and other information about the neighborhood can be mapped.

For some folks, electronic mapping plays an important role at the most personal and intimate scale. Post your cell phone's GPS address through your online community, and a Google map can show you the precise location of each of your friends on the network at that moment.

The mapping software programs present a challenge to geographers. When GIS software was first developed, it required powerful computers and extensive training. Now, anyone can create a desktop map, so what is the importance of geographic education? The answer is that geographers are equipped to explain the significance of the maps that are being created. While anyone can create a map of crime or house prices, geographers can explain why the observed patterns exist.

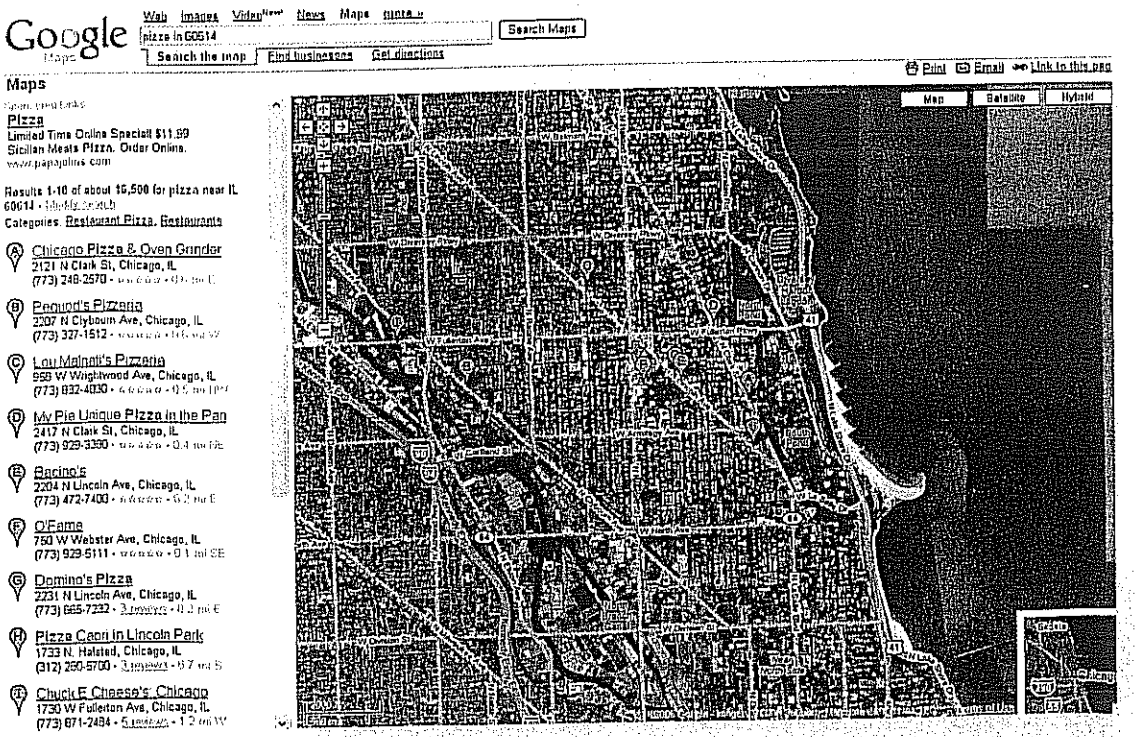

FIGURE 1–1.1 Mash-up on a Google map showing pizza restaurants in Chicago's 60614 zip code.

detected by a sensor is the resolution of the scanner. Some can sense objects as small as 1 meter across.

Geographic applications of remote sensing are primarily environmental, such as mapping vegetation and other surface cover, gathering data for large unpopulated areas such as the extent of winter ice cover on the oceans, and monitoring changes such as weather patterns and deforestation. Human geographers are interested in remote sensing to map the distribution of urban sprawl and agricultural practices.

GPS

GPS (Global Positioning System) is a system that accurately determines the precise position of something on Earth. The GPS system in use in the United States includes two dozen satellites placed in predetermined orbits, a series of tracking stations to monitor and control the satellites, and receivers that compute position, velocity, and time from the satellite signals.

GPS is most commonly used in the navigation of aircraft and ships. GPS is also being built into motor vehicles to provide the driver with directions (see Contemporary Geography Tools box). The GPS detects the vehicle's current position, the motorist programs the desired destination, and instructions are provided to tell the driver how to reach the destination. Because the vehicle's precise location is known, GPS enables a motorist to summon help in an emergency.

Geographers find GPS to be particularly useful in coding the precise location of objects. That information can later be entered as a layer in a GIS.

KEY ISSUE 2

Why Is Each Point on Earth Unique?

- Place: Unique location of a feature
- Regions: Areas of unique characteristics

Each place on Earth is in some respects unique and in other respects similar to other places. The interplay between the uniqueness of each place and the similarities among places lies at the heart of geographic inquiry into why things are found where they are. Two basic concepts help geographers to explain why every point on Earth is in some ways unique—place and region. The difference between the two concepts is partly a matter of scale: A place is a point, whereas a region is an area.

Humans possess a strong sense of place—that is, a feeling for the features that contribute to the distinctiveness of a particular spot on Earth, perhaps a hometown, vacation destination, or part of a country. Describing the features of a place or region is an essential building block for geographers to explain similarities, differences, and changes across Earth. Geographers think about where particular places and regions are located and the combination of features that make each place and region on Earth distinct.

Place: Unique Location of a Feature

Geographers describe a feature's place on Earth by identifying its **location,** the position that something occupies on Earth's surface. Geographers consider four ways to identify location: place name, site, situation, and mathematical location.

Place Names

Because all inhabited places on Earth's surface—and many uninhabited places—have been named, the most straightforward way to describe a particular location is often by referring to its place name. A **toponym** is the name given to a place on Earth.

A place may be named for a person, perhaps its founder or a famous person with no connection to the community. George Washington's name has been selected for one state, counties in 31 other states, and dozens of cities, including the national capital. Places may be named for an obscure person, such as Jenkinjones, West Virginia, named for a mine operator, and Gassaway, West Virginia, named for a U.S. senator.

Some settlers select place names associated with religion, such as St. Louis and St. Paul, whereas other names derive from ancient history, such as Athens, Attica, and Rome. A place name may also indicate the origin of its settlers. Place names commonly have British origins in North America and Australia, Portuguese origins in Brazil, Spanish origins elsewhere in Latin America, and Dutch origins in South Africa.

Pioneers lured to the American West by the prospect of finding gold or silver placed many picturesque names on the landscape. Place names in Nevada selected by successful miners include Eureka, Lucky Boy Pass, Gold Point, and Silver Peak. Unsuccessful Nevada pioneers sadly or bitterly named other places, such as Battle Mountain, Disaster Peak, and Massacre Lake. The name Jackpot was given in 1959 by the Elko, Nevada, county commissioners to a town near the Idaho state border in recognition of the importance of legalized gambling to the local economy.

The Board of Geographical Names, operated by the U.S. Geological Survey, was established in the late nineteenth century to be the final arbiter of names on U.S. maps. In recent years the board has been especially concerned with removing offensive place names, such as those with racial or ethnic connotations.

Some place names derive from features of the physical environment. Trees, valleys, bodies of water, and other natural features appear in the place names of most languages. The capital of the Netherlands, called *'s-Gravenhage* in Dutch (in English, The Hague), means "the prince's forest." Aberystwyth, in Wales, means "mouth of the River Ystwyth," while 22 kilometers (13 miles) upstream lies the tiny village of Cwmystwyth, which means "valley of the Ystwyth." The name of the river, Ystwyth, in turn, is the Welsh word for "meandering," descriptive of a stream that bends like a snake.

Places can change names. The city of Cincinnati was originally named Losantiville. The name was derived as follows: *L* is for Licking River; *os* is Latin for mouth; *anti* is Latin for opposite; *ville* is Latin for town—hence, "town opposite the mouth of the Licking River." The name was changed to

CONTEMPORARY GEOGRAPHIC TOOLS
Navigation Devices from Hand-Drawn to Electronic

The earliest maps were simple navigation devices designed to show the traveler how to get from Point A to Point B. For example, Polynesian peoples navigated among South Pacific islands for thousands of years using three-dimensional maps called stick charts, made of strips from palm trees and seashells. The shells represented islands, and the palm strips represented patterns of waves between the islands (Figure 1–2.1).

After 3,000 years of ever more complex, detailed, and accurate cartography, contemporary maps have reverted to their earliest purpose, as simple navigation devices. But to figure out how to get from one place to another, you no longer have to unfurl an ungainly map filled with hard-to-read information irrelevant to your immediate journey. Instead, you program your desired destination into an electronic navigation device. Because it knows where you are now, the device can tell you the route to take from your current location to your desired location.

Electronic navigation devices have been installed in the dashboards of motor vehicles and in handheld devices such as mobile phones, personal digital assistants (PDAs), and personal navigation devices (PNDs). All of these devices depend on GPS receivers to pinpoint your current location.

Most trips involve making a choice from among alternative routes. Navigation devices calculate which route will get you from Point A to Point B in the fastest time. Time is a function of a combination of speed and distance. The shortest route may not always be the quickest, because every road segment has an expected speed depending on its nature—an interstate highway has a higher expected speed than a local road.

The best route is also affected by attributes of the road, such as the presence of crosswalks, traffic lights, and turn restrictions. Current technology does not incorporate every possible attribute, such as construction, weather, and time of day, but presumably, future models will.

Two companies are responsible for supplying most of the information fed into navigation devices: Navteq, short for Navigation Technologies, and Tèle Atlas, originally known as Etak. Navteq, based in the United States, and Tèle Atlas, based in Belgium, were both founded in 1985.

Navteq and Tèle Atlas get their information from what they call "ground truthing." Hundreds of field researchers drive around, building the database. One person drives while the other feeds information into a notebook computer. Hundreds of attributes are recorded, such as crosswalks, turn restrictions, and name changes. Thus, electronic navigation systems ultimately depend on human observation.

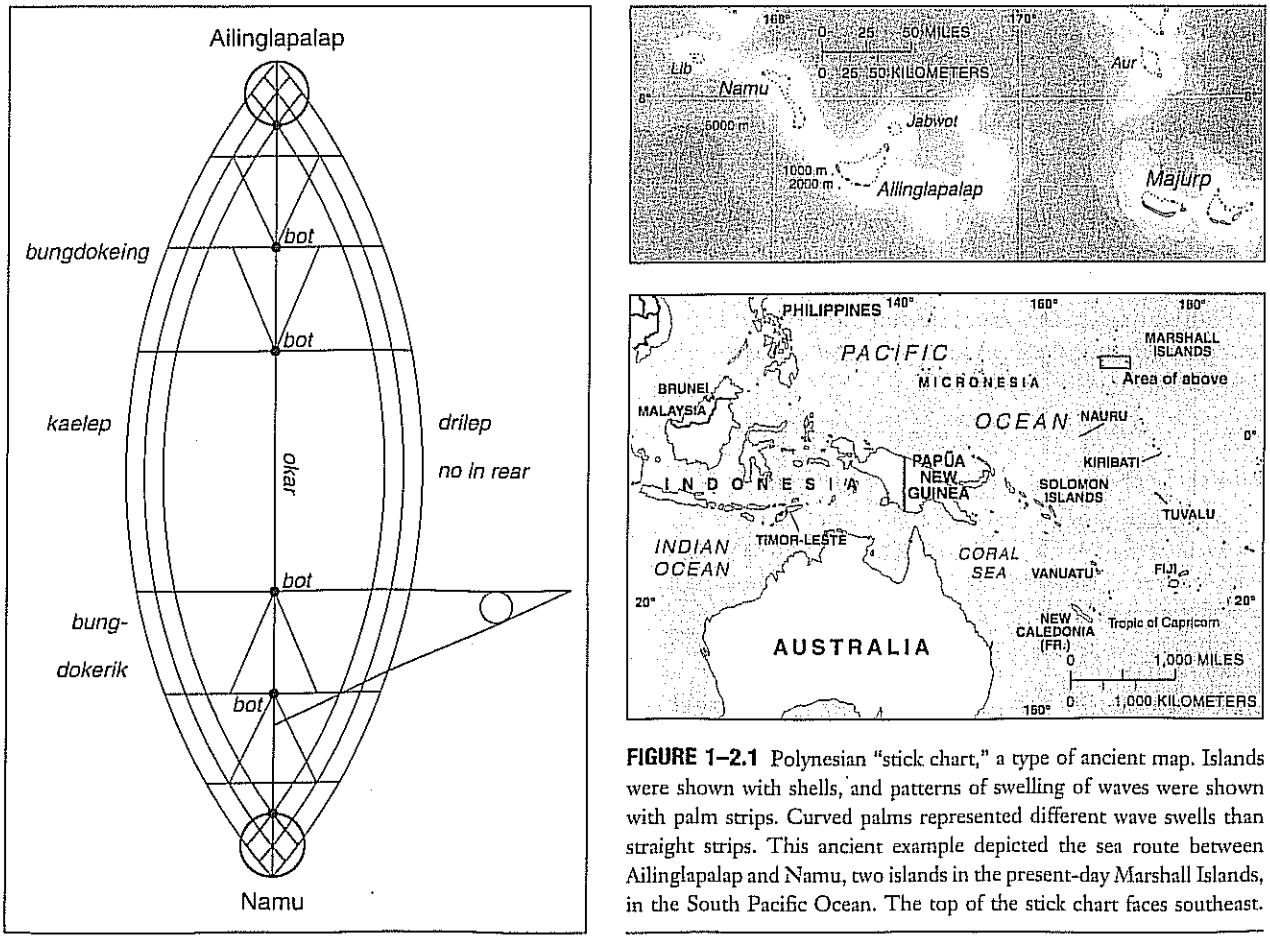

FIGURE 1–2.1 Polynesian "stick chart," a type of ancient map. Islands were shown with shells, and patterns of swelling of waves were shown with palm strips. Curved palms represented different wave swells than straight strips. This ancient example depicted the sea route between Ailinglapalap and Namu, two islands in the present-day Marshall Islands, in the South Pacific Ocean. The top of the stick chart faces southeast.